

## **ABSTRACT OF THE DISCLOSURE**

An optical element for producing an optical NOR gate uses a pair of spatial light modulators or phase shifters and one or more beam splitters to produce outputs representing respectively an XOR function of two control inputs and a COIN function of the two control inputs. The XOR output and the COIN output are combined with a phase shifted version of the source of light used to generate the XOR and COIN outputs to produce both an optical output representing a logical NOR function of the two control inputs. The same circuitry also produces an optical output representing a logical AND function of the two control inputs. The techniques disclosed permit a complete system of optical logic to be produced that can be used to produce an optical processor. The optical logic can advantageously be used in information processing and in communications.